Resource efficiency and circular economy in Europe – even more from less

An overview of policies, approaches and targets of Italy in 2018

July 2019

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Acknowledgements

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This country profile was prepared as part of the 2019 EEA review of material resource efficiency, circular economy and raw material supply policies, which aimed to collect, analyse, and disseminate information about experience with the development and implementation of these policies in EEA member and cooperating countries.

At the time of writing, a summary report is being finalised. The report reflects on trends, similarities and differences in policy responses, showcases selected policy initiatives from member countries and identifies possible considerations for the development of future policies.

These country profiles were compiled and finalised by members from the European Topic Centre on Waste and Materials in a Green Economy, namely Bart Ullstein, Bettina Bahn-Walkowiak, Jeroen Gillabel, Margareta Wahlström, Jutta-Laine Ylijoki, Dirk Nelen, Theo Geerken, Veronique Van Hoof and Evelien Dils. The responsible EEA project managers for the work were Pawel Kazmierczyk and Daniel Montalvo.

Italy, facts and figures

Note: data in this section was sourced from Eurostat databases (April 2019), except where noted otherwise

GDP: EUR 1,724.2 billion (10.9 % of total EU28 in 2017)

Per capita GDP: EUR 28,500 (purchasing power standard) (94.8 % of EU28 average per capita figure in 2017)

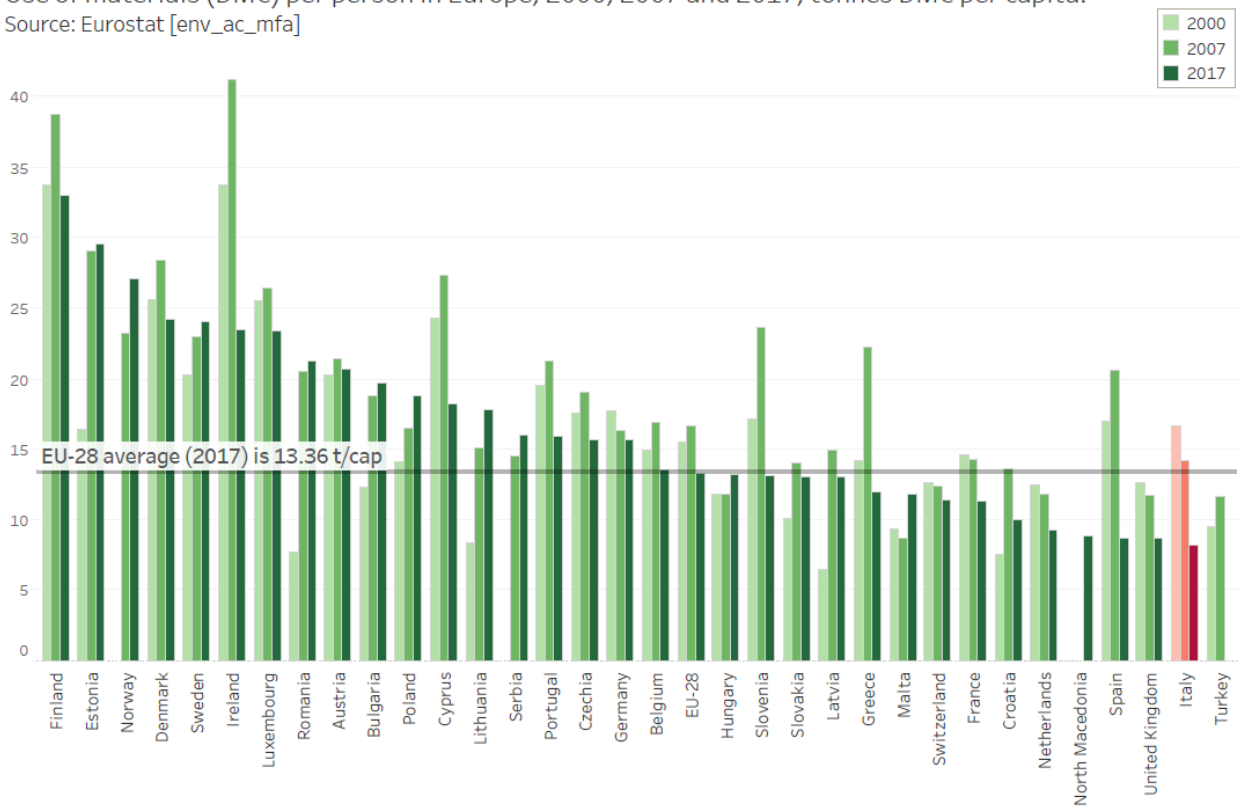
Use of materials (DMC)
493.9 million tonnes DMC (7.2 % of EU28 total in 2017)
8.2 tonnes DMC/capita (61.1 % of EU28 average per capita in 2017)

Structure of the economy:
agriculture: 2.1 %
industry: 24.0 %
services: 73.8 %

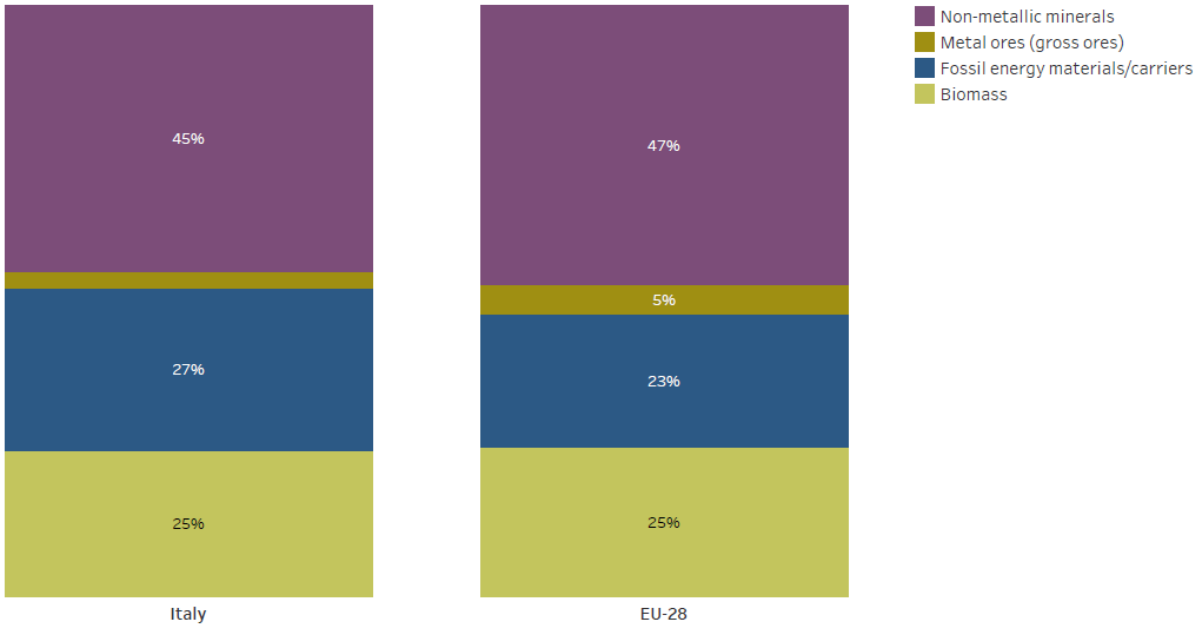
Surface area: 302.1 thousand square kilometres (km^2) (6.8 % of EU-28 total)

Population: 60.6 million (11.8 % of EU-28 total in 2017)

Use of materials (DMC) per person in Europe, 2000, 2007 and 2017, tonnes DMC per capita.
Source: Eurostat [env_ac_mfa]

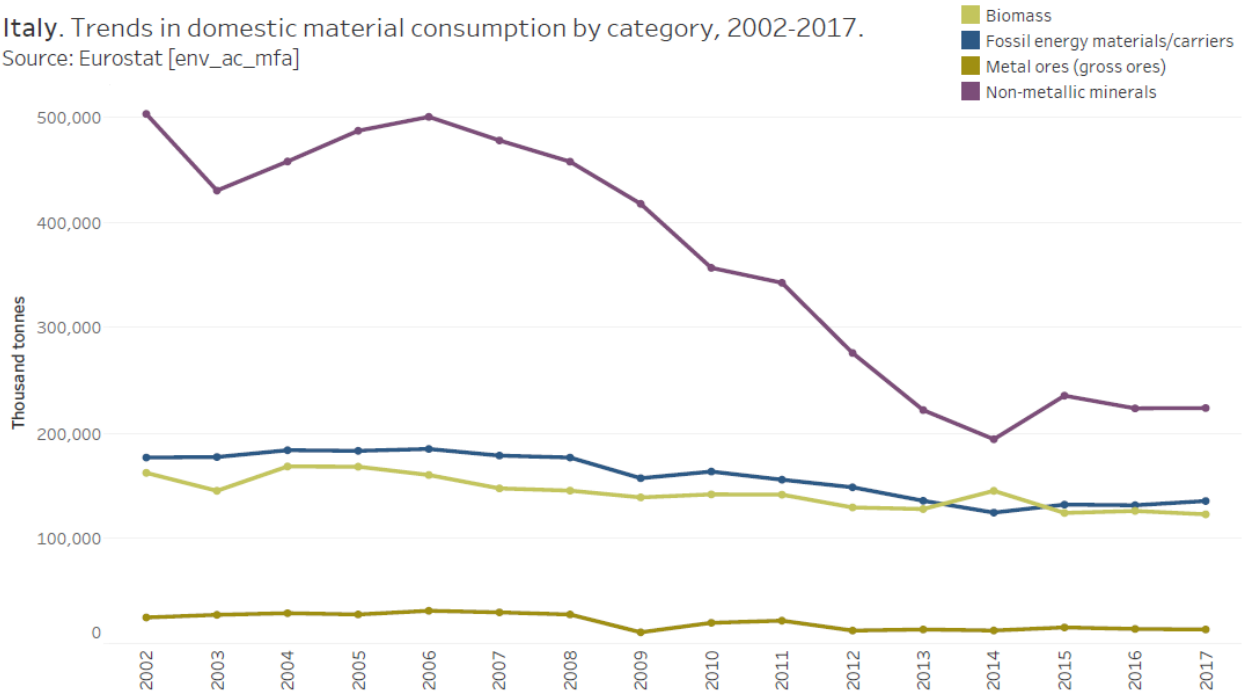


Italy & EU-28. Domestic Material Consumption by material category, 2017.
Source: Eurostat [env_ac_mfa]



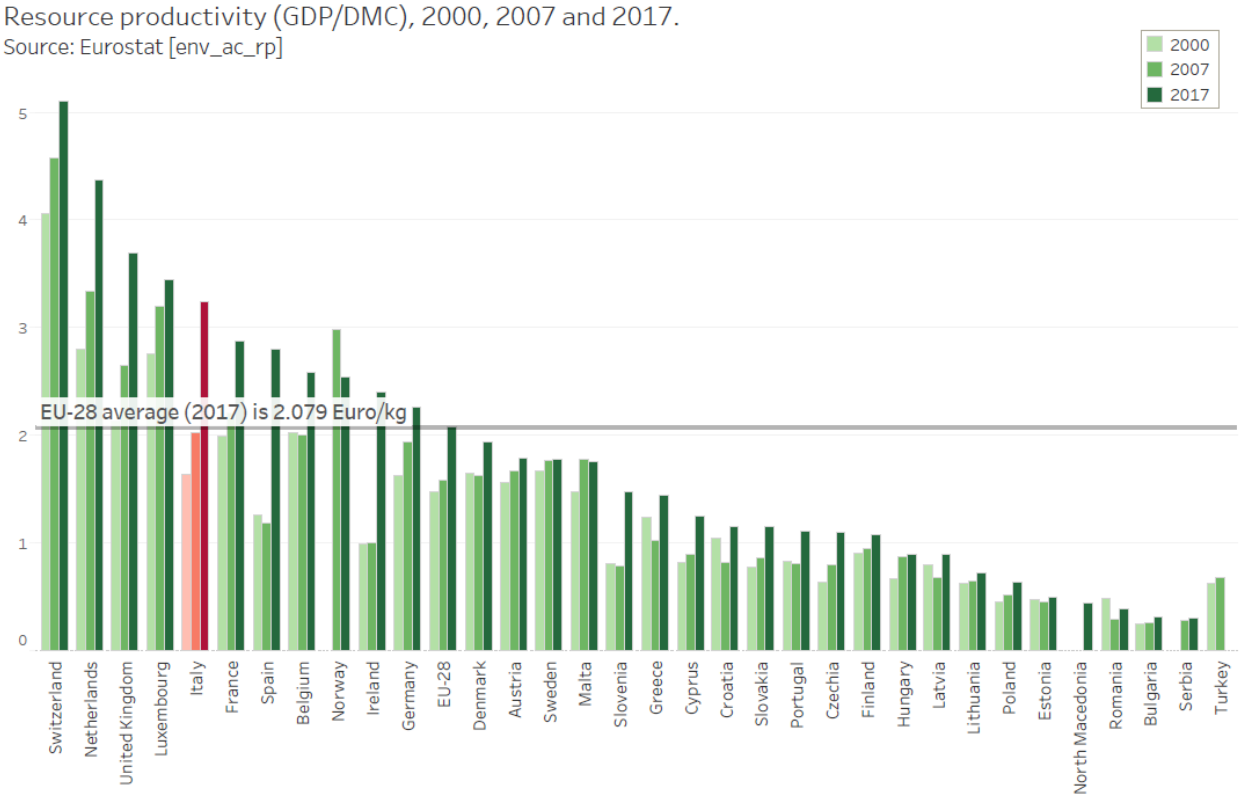
Note: The domestic material consumption categories 'other products' and 'waste for final treatment and disposal' are excluded from the figure.

Italy. Trends in domestic material consumption by category, 2002-2017.
Source: Eurostat [env_ac_mfa]



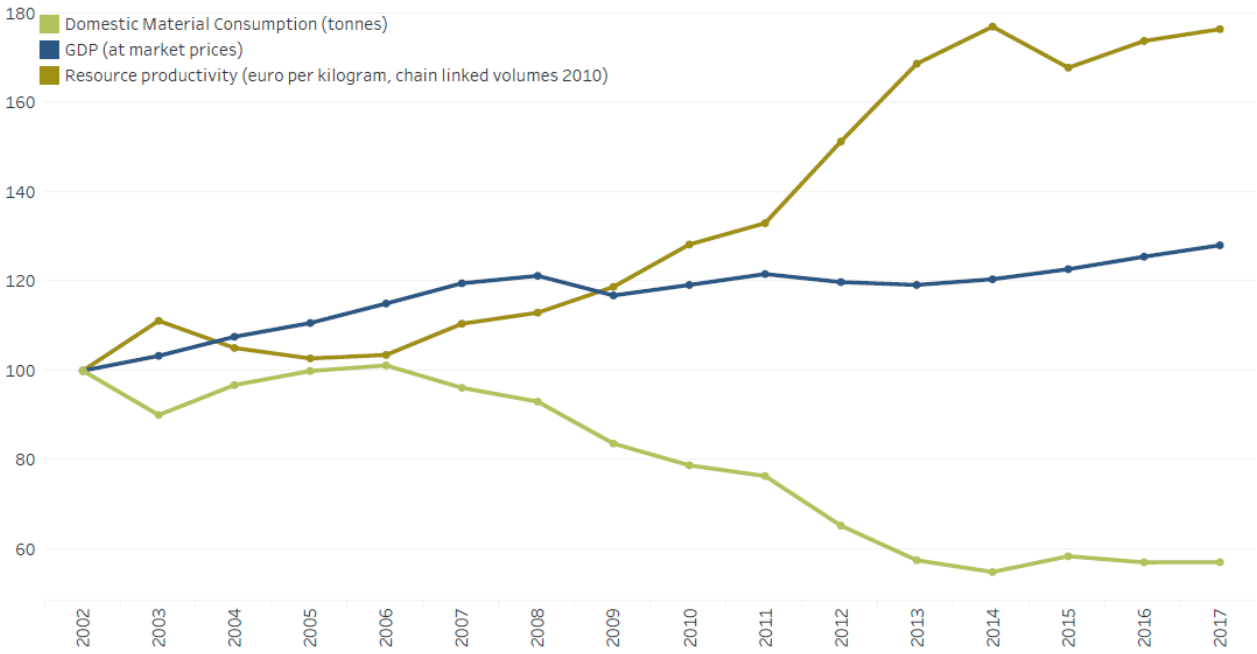
Note: The domestic material consumption categories 'other products' and 'waste for final treatment and disposal' are excluded from the figure.

Resource productivity (GDP/DMC), 2000, 2007 and 2017.
Source: Eurostat [env_ac_rp]

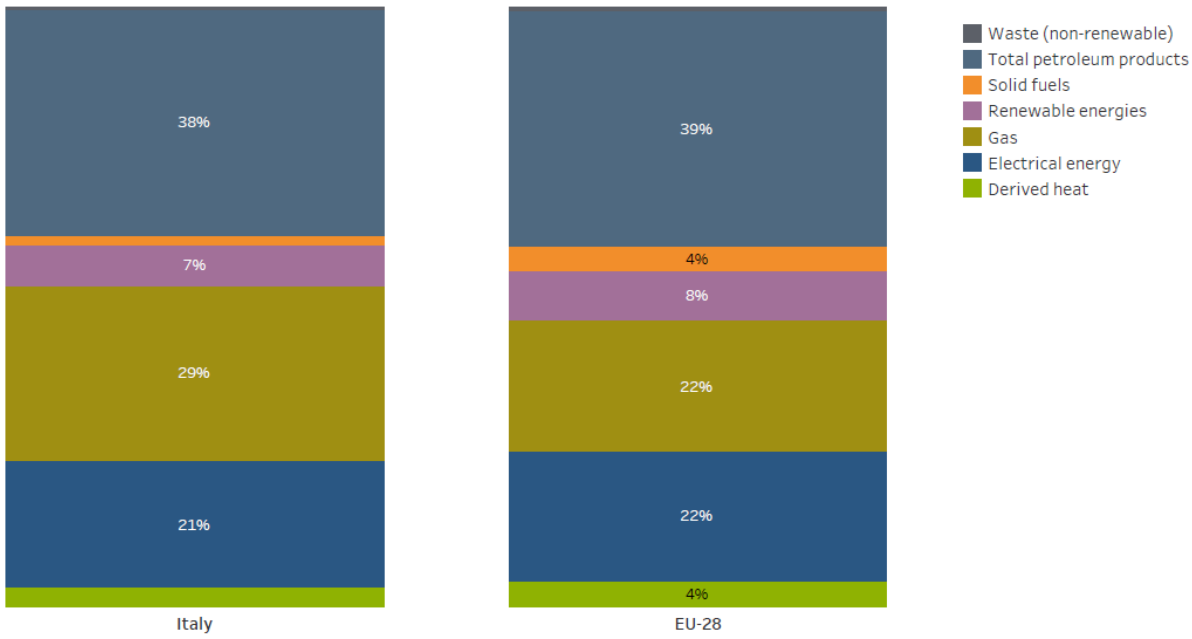


Note: GDP expressed in chain linked volumes 2010.

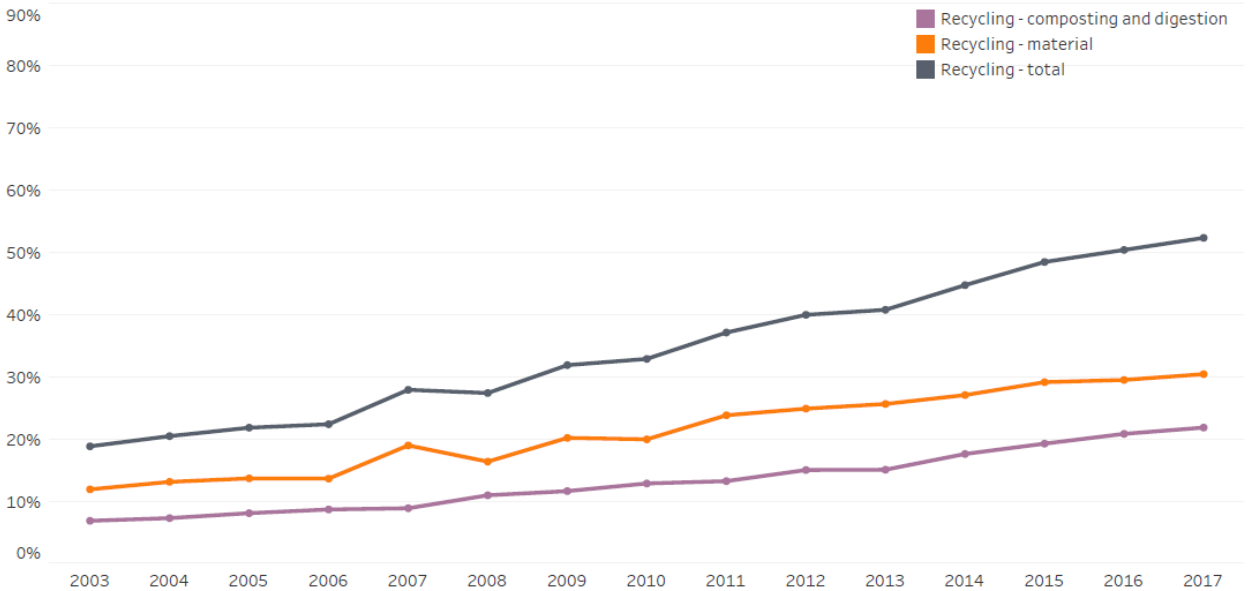
Italy. GDP, DMC and resource productivity trends, 2002-2017, index 2002=100.
Source: Eurostat [env_ac_mfa], [env_ac_rp] & [nama_10_gdp]



Italy & EU-28. Primary energy consumption by energy product, 2016.
Source: Eurostat [nrg_100a]



Italy. Recycling of municipal waste, 2003-2017, as share of total waste treatment.
Source: Eurostat [env_wasmun]



Note: The amount of municipal waste treatment is reported for the treatment operations incineration (with and without energy recovery), recycling, composting and landfilling.

Policy framework

Driving forces for material resource efficiency and circular economy

In Italy, major factors and concerns that drive material resource efficiency, circular economy and raw materials supply policies are primarily those related to economic interests, such as to strive for increased competitiveness in the national economy, to foster employment by creating new market opportunities and jobs in the green sector, also addressing social issues, and to provide a new drive for economic growth. Furthermore, regulatory requirements, such as compliance with European Union (EU) legislation and regulation, and international commitments and targets, can be considered powerful driving forces of national efforts to develop policies in these areas, since they help to set quantitative targets and rigid time frames in national policies, and legislative norms to reach them. Finally, research and innovation funding programmes, at EU and national levels, drive the integration of material resource efficiency, circular economy and raw materials supply in national thematic policies supporting the elaboration of dedicated action plans, strategies and laws and, as a consequence of their implementation, in private stakeholder/sectoral investments and action. In Italy, for example, the results of the PROFORBIOMED project[1] supported the development of networking between public and private stakeholders involved in improving the extraction of wood for energy production, also promoting the creation of the bioenergy cluster and the cascading use of wood.

Dedicated national strategies or roadmaps for material resource efficiency and a circular economy

On 29 November 2017, the Italian Minister for Environment, Land and Sea and the Minister of Economic Development launched *Towards a Circular Economy Model for Italy – Framework and Strategic Document*. The process started in April 2017 and the first release was submitted for consultation in July 2017. The Strategic Document highlights challenges and opportunities as well as the main policy instruments for switching to a different production-distribution-consumption system.

It aims to define the future landscape of both material resource efficiency and the circular economy in Italy. It also included the preparation of a dedicated set of indicators to keep track of progress upstream (quantitatively in terms of resource efficiency – for example gross domestic product (GDP)/domestic material consumption (DMC) and input-output flow analysis) and downstream (waste management).

The main principles of the Strategic Document are:

- increase the share of materials recycled and reused;
- adoption of new business models;
- widespread communication and education process;
- identification of effective indicators to monitor the transition.

The Strategic Document is composed of four main sections.

1) **Principles and objectives**: this section builds upon the knowledge base provided by international institutions and main reference documents.
2) **International, European and national contexts:** description of the main initiatives and experience abroad, as well as data provision for Italy about resource efficiency and waste recycling and management. The section ends with a list of environmental, social and economic opportunities arising from the diffusion of circular economy.
3) **Paradigm shift**: main elements for moving from a linear to a circular economy.
    - On the production side, it highlights the advantages of eco-design (durability, modularity, etc.), digitalisation and technological innovation (for example, linking with Industry 4.0 and Next Production Revolution), industrial symbiosis, bio-economy, and extended

[1] https://www.programmemed.eu/fileadmin/PROG_MED/evenement_annuel_Med/5._PROFORBIOMED.pdf (English)

producer responsibility. No focus or targets on specific sectors are presented. In fact, the questionnaire accompanying the document during the consultation phase aimed to define the most relevant sectors from the stakeholder viewpoint. The main outcomes will serve to elaborate concrete action in the next steps.

- On the consumption side, it presents the opportunity arising from the adoption of new business models, generally implying the promotion of a shift from *ownership* to *usership* (sharing economy, leasing rather buying, etc.), and raising the value of reusing/repairing (second-hand products, etc.) that can only be achieved by increasing the responsibility, involvement and awareness of consumers/citizens.
- Finally, this section describes the relevant regulatory and economic instruments that are available. It includes the establishment of a well-functioning secondary raw materials market as well as the promotion of adequate incentives such as the environmental fiscal reform – which consists primarily, but not exclusively, of shifting the fiscal burden from labour to resource use as well as the gradual phase-out of environmentally harmful subsidies. This will be successful provided that increased coherence between governance levels is achieved.

4) **Transition phase:** the main focus of the last section concerns maximising the residual value of waste – something disregarded by landfill or incineration. This implies a process of clarifying such concepts as *by-product*, *end-of-waste*, etc. in order to make waste legislation less cumbersome. The role of the public sector is also highlighted, with a focus on green public procurement (GPP), for which environmental minimum criteria for public contracts are now mandatory in Italy since reform of the *Code on Public Contracts* (Law n. 50/2016 and subsequent modifications). Great importance is given to the creation of a set of indicators at different scales: macro (country-wide); meso (intermediate levels such as regions, sectors, industrial districts); and micro (firms). To this end, a working group is currently working to define the most appropriate set of indicators (see section on Indicators to monitor progress towards a resource-efficient circular economy for further details).

After the launch and the expected governmental adoption, the next step will be the adoption of a roadmap or action plan with the definition of specific targets with the largest possible consensus.

Overview of dedicated national or sectoral strategies for raw materials

Italy does not have a dedicated national strategy for raw materials. However, below are details of some examples of sectoral strategies.

- The **Sectorial Strategy For Raw Materials** has been proposed by Laboratorio Materie Prime, a network of major mining organisations involving Assomineraria, Aitec, Marmomacchine, Anim and ANEPLA; the scientific world through the University of Milan; and public administration bodies including the Ministry for Economic Development (MISE), the Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA), the National Institute for Statistics (Istat) and the Institute for Environmental Protection and Research (ISPRA). The Strategy aims to define the main objectives and action to be promoted at governmental and regional levels to ensure an organic and coherent development of the extractive/mining industry and to ensure an adequate and secure supply of raw materials to the processing industry. The first objective of Laboratorio Materie Prime is to contribute to the development of a National Raw Materials Strategy. It also promotes all possible action to make the sector more consistent, as it is currently fragmented into many non-coherent regional norms. Lastly, it supports all the possible ways of developing a circular economy through both government and regional action to promote the recovery of raw materials.

- The **National Bioeconomy Strategy**[2], launched on 20 April 2017, addresses the sustainable use of biomass from the agriculture, forestry, and bio-based industry sectors, and natural resources in general both as raw materials and secondary raw materials, while promoting the use of renewable resources to replace non-renewable ones, the latter being by definition limited. The Strategy highlights that such a transition has to be sustainable so as not to jeopardise the stock of resources that may come under pressure if used too intensively. In a way, the Strategy also promotes circularity by creating connections and synergies (symbiosis) across different industries. For instance, relying on local biomass resources, for example for biodegradable shopping bags, will protect the local ecosystem and crop productivity through land regeneration, while marginal land can be used to grow industrial biomass and bioenergy. Similarly, biomass use for buildings will ease the sustainability of the construction sector; a *blue-growth*-oriented cosmetic and pharmaceutical industry will help to protect and increase the value of the marine environment, thereby enhancing coastal tourism and fisheries; and converting oil refineries to biorefineries will ease the re-skilling of workers who would otherwise lose their livelihoods.

- In 2018 the legislative decree 3 April 2018 n. 34 **Consolidated Text on Forests and Forest Supply Chain (CTFF)**[3], provides for principles and measures both on forests and forestry supply chains. Its main goal is the protection, conservation, enhancement and active and rational management of the forest heritage as well as the development of the local supply chains depending on it. The law clearly states that the protection, increase and improvement of the protective and productive potential of the country's forest resources is a primary public interest. To this end, a fundamental role is attributed to the active and rational management of the forest heritage, which is the main tool to be used not only for the protection of the landscape, the environment, the natural space and for the protection and prevention of natural risks of hydrogeological instability and fire, but also to enhance the economic potential of the forest, generating jobs and income capacity necessary for the permanence in mountain and rural areas of agro-silvo-pastoral entrepreneurial activities. The decree also aims to define a new **National Forest Strategy** (art. 8 comma 1 D.lgs. n. 34).

Policies which include elements of material resource efficiency

- The **Law of 28 December 2015, No. 221**[4]**,** Environmental provisions to promote Green Economy measures and contain the excessive use of natural resources, represents an important milestone for Italy with reference to material resource efficiency and the circular economy. The Law is structured in 11 sections – sustainable development and environmental protection; environmental and health impact assessment; energy and greenhouse gases; green public procurement; waste recovery incentives; waste management; land protection; water access; electronic infrastructures; disposal and reuse of plant residues; and 'miscellaneous'. A description of relevant actions undertaken with respect to resource efficiency and circular economy follows.
    - The **National Strategy for Sustainable Development** (art. 3), presented in July 2017 at the United Nations High-Level Political Forum, approved by the Council of Ministers on 2 October 2017 and waiting for final approval from the Inter-Ministerial Committee for Economic Planning (CIPE), took more than a year to elaborate as it went through a multi-stakeholder process both in stocktaking and in the finalisation of its content.

      The general idea is to promote a low-carbon, resilient and circular economic system towards 2030 and provide a general context for all strategies, policies and measures. It builds on the United Nations *Transforming our world: the 2030 Agenda for Sustainable Development*, and

[2] http://www.pdc.minambiente.it/news-ed-eventi/presentazione-bando-ppp-bio-based-industries-e-lancio-della-strategia-nazionale-la (Italian)
[3] https://www.politicheagricole.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/12774 (Italian)
[4] https://www.gazzettaufficiale.it/eli/id/2016/1/18/16G00006/sg (Italian)

rests upon the five main pillars, the five Ps: people, planet, prosperity, peace, partnership, identified in the Agenda[5]. The pillars are then organised in strategic areas and finally as national targets. There is an internal coherence across the Strategy since areas and targets are all interconnected in a systemic vision. The national targets, based on the 169 targets in the 2030 Agenda, are designed to be appropriate to the Italian context Finally, the document provides a list of indicators, managed by Istat, in line with those identified and used by the United Nations Inter-Agency Expert Group.

Relating to the Prosperity pillar, there is a specific area entitled *Ensure Sustainable Production and Consumption Patterns*, with nine national targets. The Planet pillar also considers the topic as crucial and contains another area of interest labelled *Ensure the Sustainable Management of Natural Resources*, with seven national targets.

- The **Made Green in Italy voluntary scheme**, following the successful experience of the Italian Environmental Footprint Programme launched in 2011, is a national voluntary scheme in line with European Commission Recommendation 2013/179/EU (PEF). The scheme, set up through national regulation currently being finalised, aims to increase the competitiveness of Italian eco-products in national and international markets. Its objectives and scope are:
    - to promote sustainable patterns of production and consumption, building on the work done by the former national Environmental Footprint Programme;
    - to foster the eco-competitiveness of Italian small and medium-sized enterprises (SMEs);
    - to improve the environmental performance of products and to reduce environmental impacts generated during their life cycles.

- The **National Strategy for Green Communities** aims to identify the value of rural and mountain areas which intend to exploit the main resources at their disposal – initially water, forests and landscape – and to formulate a plan for sustainable development in terms of energy and environmental and economic impact in the following areas:
    - integrated and certified heritage agro-forestry, trading of credits resulting from carbon dioxide capture, biodiversity management, certification of wood;
    - integrated management of water resources;
    - production of energy from local renewable sources – micro-hydro, biomass, wind, cogeneration, etc.;
    - development of sustainable tourism capable of enhancing local production;
    - energy efficiency and integration of smart facilities and networks;
    - sustainable development of productive activities – zero waste production;
    - integration of mobility services.

Other measures to be implemented from the Environmental Annex adopted so far are:

- National Guidelines on Separate Collection: Ministry for the Environment, Land and Sea (MATTM) Decree (26 May 2016);
- Regulation for Bio-composting: MATTM Decree (29 December 2016);
- Provisions for Small Items of Litter: MATTM Decree (15 February 2017);
- Deposit-Refund System Regulation: MATTM Decree (3 July 2017, n. 142);
- Sustainable Building: MATTM Decree (24 May 2016) – determination of rewards for eco-design services and works for new construction, renovation and maintenance of buildings and for the management of public administration buildings.

- On 19 April 2016, **Legislative Decree n. 50/2016** containing the new Italian Public Procurement Code (PPC) entered into force. Under Legislative Decree 50/2016 and Legislative Decree 56/2017

[5] http://www.minambiente.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/obiettivi_eng.pdf (English)

(Procurement code modification) GPP became mandatory in Italy. This is a major instrument not only for environmental policies but also for the promotion of technological innovation. The use of GPP, in synergy with other integrated product policy (IPP) instruments, may produce significant strategic environmental results, such as a reduction in climate-changing gas emissions, the production of wastes and the production of hazardous substances.

In Italy, the GPP National Action Plan outlines the strategy for the dissemination of GPP, the commodity categories, the environmental targets to be attained, both qualitative and quantitative, and general methodology.

- The **Italian National Plan to Prevent Food Waste**. (PINPAS, 5 June 2014)[6] is a concrete example of a participative process/multi-stakeholder platform, with two main areas of intervention measures of prevention at source and recovery through donation to charities.

  The main challenges are:
  - placing food waste prevention at the centre of the political agenda, from the local to the European level;
  - increasing and spreading knowledge about the environmental, social and economic impacts of food waste;
  - raising awareness among consumers.

- **Law no. 166 of 19 August 2016** is an intervention that was put in place to encourage the recovery and donation of food, pharmaceuticals and other products to non-profit entities.

- An example of Italian eco-efficiency development strategies to increase the competitiveness of enterprises is the **Ecologically Equipped Productive Areas (EEPA)** scheme.

  Article 26 of Legislative Decree no. 112 of 1998, known as Decree Bassanini, has led to the development of EEPAs across the country. The regions have responsibility for issuing their own laws governing and regulating EEPAs and the ecological management of the areas' infrastructure and services, funded from public or private sources.

  Enterprises aiming to increase their competitiveness and market quotas tend to invest in eco-innovation, resulting in:
  - savings in the consumption of raw materials;
  - new production processes;
  - product and service innovation.

  The EEPAs are industrial areas with high ecological standards and innovative business services, in which administrative and production processes are managed collectively on the principles of industrial symbiosis and osmosis. Clusters are aggregates of industries, connected by vertical (customer/supplier) and horizontal (common customers, technology, channels) relationships. All these new forms of business groupings lead to environmental and economic benefits. The number of companies currently engaged in network contracts grew from 30 in 2010 to 1 388 in 2014.

- The **Ministry for Economic Development (MISE)** identifies financial support for industrial innovation – indirectly supporting the circular economy – through funding and incentives[7]. Industria 4.0 is a programme that introduces tax measures to stimulate the modernisation of enterprises and their

[6] http://www.minambiente.it/sites/default/files/archivio_immagini/Galletti/Comunicati/PINPAS 10 MISURE PRIORITARIE 5 GIUGNO 2014.pdf (Italian)

[7] http://www.sviluppoeconomico.gov.it/index.php/it/per-l-impresa (Italian)

technological and digital transformation, even by introducing super amortisation mechanisms. It serves to support and stimulate companies that invest in new, novel, tangible and intangible assets (software) that are instrumental in technological and digital transformation of production processes. The MISE also works to spread a new entrepreneurial culture dedicated to collaboration, innovation and internationalisation.

Institutional setup and stakeholder engagement

Organisation of the Italian State

Italy is a parliamentary republic. This means that legislative power is entrusted to the House and Senate, the two assemblies that make up Parliament, to which deputies and senators are, respectively, elected by universal suffrage.

The other task of parliament is the election of the head of state, the president of the republic, whose task is to ensure that the rules laid down in the constitution are respected in all actions of the country's institutional and political life.

The Italian territory is divided into three levels: in addition to the state, which administers issues affecting the entire country, there are regions and communes (local authorities).

Territorial autonomous institutions

These local bodies have a certain degree of autonomy in decision making and administration, but, according to the Constitution, they must always respect the laws of the state. Local administrators are elected by the citizens of that area. In local bodies, the council has the function of the parliament, while the *junta* is equivalent to the government. At the head of the *junta*, in municipalities, is the mayor who works in the town hall. Provinces and regions are governed by a president. In Italy there are 20 regions, more than 100 provinces and over 8,000 municipalities.

The municipality

The municipality is the smallest administrative entity and therefore closest to the daily lives of citizens. Services provided by a municipality vary depending on its size: in Italy, some municipalities have more than 1 million inhabitants and some fewer than 100.

Ministries involved in developing policies related to resource efficiency and the circular economy

The ministries involved in the development of policies related to resource efficiency and the circular economy are the MATTM and MISE.

Ministry for the Environment, Land and Sea

The Ministry for the Environment, Land and Sea (MATTM) is the organ of government responsible for environmental policies.

The MATTM has responsibility for the environment, ecosystems, protection of marine and atmospheric heritage, as well as environmental impact assessments (EIAs), strategic environmental assessments (SEAs) and integrated environmental authorisations (IPPCs). It has expertise in the field of soil protection from desertification as well as hydrogeological heritage. It coordinates and oversees the functions of the Environmental Code, which sets out environmental regulations and has incorporated previous regulations.

The MATTM is organised into the office of the Minister and five General Directorates for the protection of land and water resources; protection of nature and the sea; sustainable development, climate and energy; environmental assessments; and general affairs and personnel.

Ministry for Economic Development
The Ministry for Economic Development (MISE) is the central body of the government that deals with industrial policy, international trade, communications and energy. It was established in 2006. The Ministry has competences related to four major areas of the Italian economy: industrial policy; energy policy; communications policy; and policies for internationalisation, and is organised in 14 General Directorates.

Towards a Circular Economy Model for Italy – Framework and Strategic Document
This Document comes from a joint effort of MATTM and MISE, as did the National Strategy for Bio-economy and the National Energy Strategy.

As stated by the National Strategy for Sustainable Development, there is a clear understanding that industrial policy cannot be anything but a *sustainable* one. This requires continuous discussion, through meetings and phone/e-mail exchange, to fine-tune the different environmental and economic perspectives that were traditionally, but no longer, seen as antithetic. They potentially provide synergies in an economic context where increasing demand for high environmental quality can reward technological and green innovation in terms of increased competitiveness and green jobs.

Following a first draft, the document went through a two-month stakeholder consultation in which respondents were asked to:

- provide comments and suggestions on the main document, through an easy-to-use format and a transparent system which ensured that comments were visible to all other respondents;
- fill in a questionnaire indicating, *inter alia*, priority sectors and products, potential barriers and opportunities, effective action and measures, and suitable regulatory and economic instruments;
- present main features of experience and practice already undertaken by companies and other economic agents, such as local communities. In the future, an online platform to facilitate the sharing of experience between firms or geographical areas may be developed.

The main results of the consultation can be briefly summarised as:

- review the legislation to increase coherence and simplify the implementation of proposed measures;
- define a clear and adequate system of economic incentives to switch to circular and sustainable production and consumption models, promoting environmental fiscal reform;
- increase the awareness of citizens and consumers through communication and education, as well as increase/tailor the skills of civil servants as required at all levels;
- enhance investment in research and development to boost innovation and the competitiveness of the national economic system.

Initiatives for energy audits and energy management systems for small and medium enterprises
The National Energy Strategy 2017 promotes the extension of co-funded initiatives for energy audits and energy management systems for SMEs.

- **Symbiosis Users' Network**

On 21 April 2017 a cooperation agreement was signed for the establishment of a Symbiosis Users' Network (SUN) between the MATTM, MISE, ENEA, Confindustria, some Italian universities and various associations operating in the field of the environment.

The agreement has the following objectives:

- promote eco-innovation and transition to a circular economy through the application of industrial symbiosis;
- promote collaboration between the various operators, both public and private, on the theme of industrial symbiosis;

- promote the SUN as the reference for operators who want to apply industrial symbiosis, at the industrial level of research and territory;
- promote the collection and sharing of experience, the examination of issues, and the development of economic, territorial and social opportunities for industrial symbiosis;
- encourage collaboration and promote contacts and exchange of information, knowledge and experience between research institutions, universities, SMEs, businesses, etc.;
- identify solutions to major technical and regulatory bottlenecks in the implementation of industrial symbiosis pathways;
- transfer and disseminate information to members through databases, websites, etc.; and organise conferences and seminars.

- **Ecoinnovation Sicily**

With the **Ecoinnovation Sicily** project, ENEA has promoted the creation of the **first industrial symbiosis platform in Italy** – a place where supply and demand meet, and in which to create **synergies between Sicilian companies** to promote eco-sustainability in some important production sectors of the region. The first of these are **waste electrical and electronic equipment (**WEEE), **plastics** and tourism in the smaller islands.

The green industrial symbiosis project in Emilia-Romagna

An industrial symbiosis pilot project was developed within the Green Economy and Sustainable Development project in Emilia-Romagna, organised by Unioncamere Emilia-Romagna and ASTER, a consortium for innovation and technology transfer, with technical and scientific coordination of the Environmental Technologies Technical Unit of ENEA. In addition, researchers from the Emilia-Romagna High Technology Network have contributed scientific and technological expertise to the project. The project's objective was the development of cross-relations between production sectors, industrial research and territory, and boosting the transition to a circular economy. Since it was a pilot project, the first ever in the region, it was decided to focus on the chain of reuse and enhancement of agro-industrial waste and residues, with particular (but not exclusive) interest in solutions aimed at the production of materials with high added value.

- **Rieti-Cittaducale Industrial Park**

In the Rieti-Cittaducale Industrial Park, ENEA and the University of Tuscia, with the support of the Consortium for Industrial Development of Rieti, have created a network of 28 companies and identified 33 synergies with the aim of recycling 300 tonnes of woody biomass – worth more than EUR 10,000 – and reuse 15,000 wooden crates, pallets and cardboard packaging worth EUR 200,000.

- **Interreg Europe TRIS project, Emilia-Romagna**

The challenge for TRIS is enabling the systemic uptake of industrial symbiosis in five European regions, supporting policymakers to increase the competitiveness of their SMEs by introducing industrial symbiosis practices. TRIS will benefit greatly from interregional cooperation, given the diversity in terms of geography, productive systems and maturity of industrial symbiosis practices – the City of Birmingham, UK, the project leader, is the most advanced, Hungary and Emilia-Romagna have tested pilot projects, while southern Sweden and Valencia, Spain, have only recently begun. Industrial symbiosis will play both an advisory and dissemination role, acting as a bridge between the consortium and the European perspective. The objective of the project, consistent with regional waste management policies, is to facilitate the adoption of industrial symbiosis practices aimed at the reuse of by-products and the reduction of waste from industrial processes.

Approaches to resource efficiency and circular economy policy evaluation

In the context of *Towards a Circular Economy Model for Italy – Framework and Strategic Document*, the group working on the indicators is considering elaborating analytical tools for *ex-ante* and *ex-post* policy evaluation.

Ex-Ante: once targets and relevant indicators are defined, there can be space, depending on available resources, for a scenario analysis from both macro and sectoral perspectives to see the future evolution of the main variables related to a circular economy and resource efficiency in a business-as-usual no-policy scenario compared to mild and strong policy scenarios, such as to assess the costs and benefits of the transition induced by policy drivers at different levels of magnitude.

Ex-post: as mentioned, the Document is a prelude to a future Action Plan that is expected to be revised on a regular basis. The set of indicators will help monitor the effect of policy measures once implemented and organising meetings with stakeholders will ensure that all selected variables of interests are considered.

Monitoring and targets

Targets for resource efficiency and circular economy

Italy has a few examples at regional level:

- **Emilia Romagna**:
  - separate waste collection: **73 per cent by 2020;**
  - per person waste generation: decrease by **25 per cent by 2020** relative to 2011;
  - recycling: **70 per cent by 2020.**

- **Lazio**[8]**:**
  - separate waste collection: 65 per cent by 2020.

Indicators to monitor progress towards a resource-efficient circular economy

- Within the ongoing **National Strategy for Sustainable Development** (presented at the United Nations High-Level Political Forum in July 2017 and adopted by the Council of Ministers on 2 October 2017) there is an alignment of the targets defined in Agenda 2030, as re-organised and re-phrased in the Italian context, with indicators monitored by Istat. Relevant indicators are: domestic material consumption, aggregate, per person, per unit of GDP; and waste management, the percentage of recycling and the share of urban waste collected separately. Even though the alignment has been adopted by the Italian government, a comprehensive timeline with quantitative targets will be defined at a later stage. Focus groups with relevant stakeholders will be built specifically to consider the different dimensions of each topic to ensure that targets are ambitious but realistic and set through a participatory and inclusive process.

- A participatory process also contributes to the new set of indicators (core set of indicators of the National System for Environmental Protection) adopted in March 2017 to monitor the state of the Italian environment and managed by ISPRA[9]. The dataset is composed of 60 immediately usable indicators with another 49 needing further development. It is worth noting that one of the indicators concerns land use, assessed yearly in a dedicated report.

- At the national level, the same indicators related to waste and material flows are available on the website of the *Environmental Data Yearbook*[10]. Furthermore, this website has a specific section showing the relationship (presence and/or absence) between the indicators of the ISPRA

[8] http://www.regione.lazio.it/rl_rifiuti/?vw=newsDettaglio&id=33 (Italian)

[9] http://www.isprambiente.gov.it/en/publications/publications-of-the-agency-sistem/Towards-a-common-core-set-of-indicators-of-the-National-System-for-Environmental-Protection?set_language=en (English)

[10] http://www.isprambiente.gov.it/en/publications/state-of-the-environment/environmental-data-yearbook-2016-edition?set_language=en (English)

Environmental Data Yearbook and some of the major national and international core sets, including the *Resource Efficiency Scoreboard* related to themes of the *Roadmap to a Resource Efficient Europe*. Matching is not always unambiguous. Sometimes, one of the Yearbook's indicators matches one or more indicators of the international core sets considered, or, *vice versa*, more than one of the Yearbook's indicators or parts of them correspond to a single indicator of the core set.

- Istat is in charge of sending environmental accounts to EUROSTAT, including economy-wide material flow (EW-MFA) and physical energy flow accounts (PEFA).

- Within the context of the **document on a resource-efficient circular economy**, *Towards a Circular Economy Model for Italy – Framework and Strategic Document* launched on 29 November 2017, a working group led by ENEA and involving representatives of the MATTM and MISE as well as a few external consultants, was established to define the most suitable set of indicators to monitor progress on resource efficiency and the circular economy in Italy. The indicators are divided into three main categories:
    - *macro*: to measure country-wide performance and report data, *inter alia*, on resource productivity, resource import/export, waste production, waste recycling/reuse/recovery shares, and information on the secondary raw materials market;
    - *meso* (intermediate): to measure performance at regional or sectoral levels, or with reference to industrial districts, metropolitan urban areas and business model typologies;
    - *micro*: to report the company perspective mainly through input-output material flows within a general life-cycle assessment, providing evidence about elements used in the production process of renewable resources; recycled and recyclable resources and bio-based products. So far, no specific threshold of size/turnover of companies has been defined, though ideally it will be applied to firms committed to providing non-financial information under EU Directive 2014/95/EU and adopted in Italy by Legislative Decree n. 254/2016. Companies are also expected to provide sustainability reports including details of their carbon, water and material footprints.

The full set of indicators has been released in May 2018 in the report *Circular Economy and Resources Efficiency: Indicators for circular economy*[11] issued by the Ministries of Environment and Economic development (MATTM and MISE) in the awareness that measurement of circularity is essential toward the achievement of measurable results, to tend towards greater transparency for the market and for the consumer.

One major challenge comes in comparing the circularity and sustainability dimensions, thereby highlighting the impacts of transition on society and the environment at different levels, with special reference to new business models, the final impacts of which require further investigation (see EEA report 6/2017, *Circular by Design*[12]).

Resource efficiency, circular economy and the 2030 Sustainable Development Goals

Ecodom[13] is Italy's largest organisation engaged in the treatment of WEEE. It is a private, not-for-profit consortium, founded in 2004 and operational since 2008, with 28 member companies with a share of approximately 60 per cent of the large household appliance market. The aim is to maximise the recovery of secondary raw materials and minimise environmental risk, benefiting member producers and society. Website:

[11] https://www.minambiente.it/sites/default/files/archivio_immagini/economia_circolare_ed_uso_efficiente_delle_risorse_-_indicatori_per_la_misurazione_della_circolartita_-_bozza_maggio_2018.pdf (Italian)

[12] https://www.eea.europa.eu/publications/circular-by-design (English)

[13] http://www.ecodom-consorzio.it/en/ (English)

Remedia[14] assists its members and customers to integrate sustainability into their business strategies. It does so by planning and producing excellent services for the integrated handling of WEEE, batteries and accumulators, thus contributing to general environmental quality. The Remedia consortium provides a broad and exhaustive portfolio of services both for producers and users of electrical and electronic equipment, batteries and accumulators, all of which are subject to legal requirements concerning their end-of-life.

The Remedia/Ecodom contribution to sustainable development goals includes:

- **Target 8.4**: progressively improve, through 2030, global resource efficiency in consumption and production, and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programmes on sustainable consumption and production, with developed countries taking the lead.
- **Target 11.6**: by 2030, to reduce the adverse per person environmental impact of cities, including by paying special attention to air quality and municipal and other waste management. Approximately 95 889 tonnes of WEEE were handled by Ecodom in 2016.
- **Target 12.2**: by 2030, to achieve the sustainable management and efficient use of natural resources. In 2016, 84,206 tonnes of secondary raw materials were recycled and returned to production cycles.
- **Target 12.4**: by 2020, to achieve the environmentally sound management of chemicals and all wastes throughout their life cycles in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil to minimise their adverse impacts on human health and the environment. Working with Ecodom, 805,869 tonnes of carbon dioxide were saved.
- **Target 12.5**: by 2030, to substantially reduce waste generation through prevention, reduction, recycling and reuse: Ecodom recycles more than 30 per cent of the WEEE generated in Italy.
- **Target 13.2**: to integrate climate change measures into national policies, strategies and planning. Ecodom collaborates with the European Committee for Electrotechnical Standardisation (CENELEC) to develop standards that help businesses and organisations improve their environmental performance.

CENELEC [15] is responsible for standardisation in the electro-technical engineering field. It prepares voluntary standards, which help facilitate trade between countries, create new markets, cut compliance costs and support the development of a single European market.

Examples of innovative approaches and good practice

Examples of good practice and innovative approaches

Italy uses mainly voluntary agreements[16], initiatives and standards for products and services, and supports extended producer responsibility for materials and products to foster resource efficiency.

Italy is a front runner for European voluntary environmental certifications such as the EU Eco-Management and Audit Scheme (EMAS) and EU Ecolabel.

The EU ecolabel, ISO type I (ISO14024) certification, is awarded to the best 10–20 per cent of products/services with reduced environmental impacts and high performance. As of October 2017, the Italian competent body has awarded 360 licences – contracts with Italian companies, representing around 17 per cent of the EU total – covering more than 9,000 EU ecolabelled products/services. According to these figures, Italy ranks second amongst EU Member States, after France, for the number of signed EU ecolabel contracts, and second after Spain for the number of EU ecolabelled products/services. Certification can also be awarded to 29 product/service groups, the most appealing of which, both in

[14] http://www.consorzioremedia.it/en/ (English)
[15] https://www.cenelec.eu/ (English)
[16] http://www.minambiente.it/pagina/program-voluntary-agreements (Italian)

Europe and in Italy, is the tourist accommodation service sector – 786 out of 2,130 EU ecolabel licensees have been signed for hotels and camp sites, nearly 30 per cent of which are in Italy.

As regards EMAS Regulation, currently the number of active organisations on the Italian register is 977, a decrease of 2 per cent since 2015. The northern regions of Italy have the most but otherwise registrations are equally distributed among small, medium and large organisations and public administrations. Waste, local authorities and energy are the most important sectors by number of registrations. Amongst Member States, Italy ranks second after Germany and is followed by Spain.

There are some other notable examples such as the Italian Environmental Footprint Programme, launched by MATTM, concerning the carbon and water footprints of goods/services. The Programme aims to promote companies' voluntary commitment to the evaluation of their environmental performance and the reduction of their greenhouse gas emissions, and has become an important tool in enhancing the measures foreseen in the norms and policies of the Kyoto Protocol and the EU's Climate and Energy package, as well as in the recent approval of the European Circular Economy package. The Programme aims to identify companies' carbon management procedures and support the use of low-carbon content technologies and good practice in manufacturing.

Many large national enterprises joined the Programme promoted by the MATTM.

The Italian Circular Economy Stakeholder Platform (ICESP)[17], launched by ENEA in order to promote the Italian transition to the circular economy, could be considered a good practice as an information platforms for a variety of stakeholders including consumers, professionals, companies and authorities. ENEA is the only representative of the research community in the Coordination Group of the European Circular Economy Stakeholder Platform (ECESP), i.e. the European Platform for the Circular Economy. The Italian Circular Economy Platform, in analogy with the European one, is structured as a network of networks and aims to create a national hub to discuss experiences, critical issues, best practice and policy initiatives among all the stakeholders. The platform consists of representatives from the scientific, institutional and business world that have signed the ICESP Memorandum of Understanding, a manifesto that defines the issues of common interest inherent in the circular economy and the operating process of the Platform.

Financial support programme

- **Planning agreements and incentives for the purchase of products resulting from post-consumer materials**

The MATTM started to develop a National Strategy for Consumption and Sustainable Production in 2008. A first document was prepared by the MATTM and shared in its programme lines within the Management Committee of the Action Plan for the Environmental Sustainability of Consumption in Public Administration (PAN-GPP). In January 2013, a new proposal was presented to the Minister, which included much of the September 2008 document. Law n. 221/2015 gave the MATTM, together with the MISE, the Ministry of Agriculture and the Ministry of Economy and Finance, the responsibility of adopting a National Action Plan on Consumption and Sustainable Production (PAN-SCP).

The PAN-SCP provides for the adoption of minimum environmental criteria (CAMs) for different groups of products, services and jobs. These CAMs are defined within specific working groups, in which representatives of the economic operators participate – as well as the Management Committee, representatives of various ministries, the public administration's central purchasing organisation (Consip) and environmental agencies.

The PAN-SCP's development process identified six intervention areas, each with targeted action lines:

1) SMEs, chains and production districts;

[17] http://www.icesp.it/ (Italian)

2) agriculture and agro-industrial chains;
3) buildings and dwellings;
4) tourism;
5) organised distribution;
6) consumption and sustainable behaviour.

Some significant measures:

- The application of CAMs in the public procurement of material supplies and services within the categories is included in the PAN-GPP.
- The presence of the percentage of recycled and post-consumer recycled materials can be certified by authorised bodies. Tools and incentives, including tax, for the trade and purchase of products and components of products must be established and used to facilitate the extension of product life cycles: purchase and sale of manufactured goods made of polymeric materials, mixed recycled polymeric heterogeneous materials, and recycled polymeric heterogeneous materials in manufactured articles.
- Incentives for the production and purchasing of recycled products, to be implemented through programme agreements between public and private bodies and associations.
- Provisions to support prevention policies in waste production.
- Provisions to foster the collection and treatment of organic waste composting.
- Regions can promote measures to increase separate collection and reduce the amount of waste not recycled.

- **Diversified Environmental Contribution – National Packaging Consortium**

In order to encourage the use of more recyclable packaging, the National Packing Consortium (CONAI) has established a scale for determining the Environmental Contribution (CAC) that producers/users must pay for plastic packaging.

The CAC is a mechanism through which CONAI shares the higher costs of separate collection, recycling and recovery of packaging waste between producers and users.

The Contribution varies according to three basic parameters:

- ease of packaging separation after recycling;
- effective recyclability, assessed on the basis of available technologies;
- end user – domestic or trade/industry.

Based on these parameters, the following three categories of plastic packaging were identified: separable and recyclable packaging from trade and industry; separable and recyclable domestic packaging; and packaging that cannot currently be separated/recycled.

Examples of lightweight packaging include:

- separable and recyclable packaging from trade and industry: bags and big bags for industrial use, kegs for water dispensers, etc.;
- separable and recyclable domestic packaging: bottles, containers up to 5 litres, etc.

- **Financing research projects for the development of technologies for the recovery, recycling and treatment of WEEE and the waste not managed by industrial consortia – MATTM**

In May 2017, the MATTM issued two tenders totalling EUR 2.1 million.

The first EUR 900,000 call is for co-financing research projects for the development of new systems for the recovery, recycling and treatment of WEEE. The second, a EUR 1.2 million call, is aimed at those waste categories that do not fall within those already served by consortia, at the eco-design of products and the proper management of the related waste – hazardous urban waste; wastes from absorbent sanitary products; other waste from disposable goods; hard plastic waste.

The calls focus on the efficient use of raw materials, and the development and strengthening of the circularity between waste management and the market of products and materials, favouring reuse in new production cycles. The goal is to provide industrial-scale incentives for innovative and sustainable technologies for the treatment of materials from complex end-of-life products, as well as the development of product eco-design to facilitate the dismantling industry, the separation of individual components and the start-up of environmental matrix recycling.

Environmental education
Environmental education is a fundamental tool for raising awareness among citizens and communities of their responsibility to pay greater attention to environmental issues and good governance.

At the beginning of the 2015 school year the MATTM, in collaboration with the Ministry of Education, launched new guidelines for environmental education. The collaboration between the two ministries was strengthened in 2016 with the signing of a memorandum of understanding on environmental education and sustainable development in schools.

To present and conclude the agreement, the second National Conference on Environmental Education and Sustainable Development was held in Rome on 22–23 November 2016, at the end of which the two ministers signed a National Charter on the subject, drawn up with the contributions of hundreds of experts and senior representatives from institutions, associations, businesses and universities.

At the conference, a specific paper was presented on the circular economy containing four guidelines.

- **Industry-technology:** industry interacts with the world of the school and informal education. Producers can be active within educational trials to improve approaches to the circular economy.
- **Research and development/new materials/new planning**: research and development is a priority for the growth of new skills to develop circular production models.
- **New languages:** through education it is possible to work on the language of the circular economy.
- **Art**: cinema, theatre and music can be good tools to communicate and promote awareness of circularity.

Twelve papers were presented at the conference, covering biodiversity, Agenda 2030, sustainable mobility, civil society, digital and communication, environment and health, circular economy, sustainable tourism, climate change, cities and climate change, management of natural resources, and food waste.

Seeking synergies with other policy areas

Italy has several examples of policy initiatives that deliberately seek to create synergies and co-benefits between resource efficiency/circular economy and other policy areas, such as GPP, Industry 4.0 and sustainable mobility.

- **Mandatory green public procurement and minimum environmental criteria**[18]

Through Ministerial Decree M. 11/04/2008, the Green Public Procurement Environmental Sustainability Action Plan (PAN-GPP or the Green Public Procurement Plan) was adopted.

The Plan aims to maximise the diffusion of green procurement within public bodies. To this end, it identifies priority categories of goods and services by their environmental impacts and expenditure volumes on which to define minimum environmental criteria (MEC) for the provision of services and supplies. These MEC were adopted for various services and supplies by Ministerial Decree.

[18] http://www.minambiente.it/pagina/gpp-acquisti-verdi (Italian)

With the adoption of Law 221/2015 Environment provisions to promote Green Economy measures and contain excessive use of natural resources, Italy was the first country in the EU to introduce the mandatory use of MEC for all public procurement of products, services and works.

The MEC give general guidelines to institutions for the rationalisation of purchases and provide them with principles of environmental quality linked to the different phases of procurement of supplies along the whole life cycle of services and products.

In relation to specific commodities or services, MEC may involve prescription on eco- and modular design, durability of materials, recycled content and criteria for reuse and repair.

On 19 April 2016, Legislative Decree n. 50/2016 containing the new Italian Public Procurement Code (PPC) entered into force. On the basis of Legislative Decree 50/2016 and Legislative Decree 56/2017, GPP becomes a mandatory tool in Italy. GPP is a major instrument not only for environmental policies but also for the promotion of technological innovation. The use of GPP, alongside other IPP instruments, may produce significant strategic environmental results, such as a reduction in climate-changing emissions, the production of wastes or the production of hazardous substances. In Italy, the PAN-GPP outlines the strategy for the dissemination of GPP, commodity categories, environmental targets to be attained, both qualitative and quantitative, and general methodology.

The application of MEC concerns various product categories such as electronic devices, lighting, the supply of paper, cleaning products, catering and sustainable construction materials.

From 2011, MECs entered into force for the following: furniture for offices, schools and libraries; construction and renovation of buildings and roads; urban waste management, the management of public green areas; energy services, lighting, heating and cooling of buildings, public lighting and illuminated signs; electrical and electronic office equipment, related supplies and telecommunications equipment; textiles and footwear; catering, canteen services and food supplies; cleaning services; transport services and sustainable mobility systems.

With Decree n. 159 of 10 July 2012, the Guidelines for the Integration of Social Considerations into Public Procurement were adopted. The widespread application of sustainable public procurement practices will be useful in tackling the exploitation of the workforce; dumping based on illegal practices; unfair international competition; and the spread of poverty and degradation, all of which have negative effects on society, the environment and the economy in the long term.
The Decree of 11 January 2017 has also provided MEC for the design of buildings (new construction, refurbishment and maintenance of existing buildings).

By Decree 27 September 2017 Italian Ministry of Environment issued MEC for Public Lighting Services.
Green public procurement also concerns incentives, reduced guarantees/shortlisting, for operators with EMAS or ecolabel certification.

- **Industry 4.0**

Industry 4.0 springs from the concept of the fourth industrial revolution that will bring fully automated and interconnected industrial production. Italy's Industry 4.0 plan represents an opportunity for a transition to a circular economy, in general by supporting investment in research and development and innovative technologies, and by promoting the diffusion of enterprise-based data collection and analysis systems, with the aim of streamlining production processes in terms of both time and resources used.

At company level, it will make the optimisation of resource consumption possible, and reduce energy waste and the generation of waste in production.

- **Sustainable mobility policies developed by the Ministry for the Environment, Land and Sea**

The MATTM is committed to promoting sustainable mobility policies aimed at reducing the environmental impacts associated with the transport sector. To achieve the mitigation objectives of climate change, the MATTM has initiated and developed a number of actions.

- **National Sharing Mobility Observatory.** On 15 September 2015, the Agreement on Analysis and Monitoring of the Development of Shared Mobility in Italy was initiated under the auspices of the National Sharing Mobility Observatory with the aim of acquiring data on the economic, social and environmental impacts of the action carried out at national level arising from various mobility-sharing activities – car sharing or pooling, bike sharing, etc.
- **National experimental programme for sustainable home-to-school mobility and home working.** In October 2016, under Law 221/2015, a notice was issued for funding projects to encourage urban mobility alternatives to private cars in an effort to reduce pollution. The programme is funded with EUR 35 million. The 114 projects submitted involved 483 local authorities. The programme supports the realisation and/or enhancement of collective and/or shared low-emission mobility services and facilities, in particular car sharing, bike sharing, scooter sharing, etc.
- **Programme of energy efficiency and sustainable mobility on the smaller islands.** With the Directorial Decree n. 340 of 14 July 2017, the MATTM initiated a national co-financing programme of integrated projects implemented on smaller islands not connected to the national energy grid, related to energy efficiency, sustainable mobility and adaptation to climate change. The programme, worth EUR 15 million, funds action including car pooling or sharing, bike pooling or sharing, etc.

An example of a policy initiative in Italy which seeks to make imports of materials and products more sustainable is the intensive programme on the environmental footprint of goods/services/organisations, in line with the European study of Product Environmental Footprints (PEF), in 2011 led by the MATTM,. It was a good example of public-private cooperation, with the involvement of more than 200 actors, including companies, municipalities and universities.

The initiative aimed to promote companies' voluntary commitment to the evaluation of their environmental performance and the reduction of greenhouse gas emissions. It became an important tool to enhance the measures foreseen in the norms and policies of the Kyoto Protocol and the EU Climate and Energy package, as well as in the recent approval of the EU Circular Economy package.

The project aims to identify companies' carbon management procedures and support the use of low-carbon technologies and good practices in manufacturing processes. This work represents:

- an environmental driver and also a competitive tool for all Italian companies that takes into account the importance of the eco-friendly requirements of products on the market;
- an incentive to rethink the production and supply system cycles;
- an opportunity to create a new awareness for users, to encourage increasingly responsible choices and good practice.

Many large enterprises joined the programme promoted by the MATTM, such as the shipping company Grimaldi Lines, DHL and Palm.

The soon-to-be-launched national scheme, Made Green in Italy, will be another step forward and will promote local supply chains and raw materials to reduce the risk of shifting the environmental burden of products beyond borders.

Resource efficiency and circular economy policy initiatives from subnational to local level

In **the Lombardy region**, the **Regional Strategy for the Sustainable Management of Raw Materials** (2015)[19] is focused on inert materials and aims to renew the regulatory framework on quarrying activities, with a particular focus on environmental assessments, rational land use, raw material saving and environmental conservation of landscapes, with the recovery of abandoned quarry sites.

Moreover, the Strategy promotes the circular economy by ensuring the preservation of local productivity. It aims to create a database to track the flow of recycled materials and introduce a certification system for them.

In line with the principles of EU policy and the application of the principles of sustainable development (environmental, social and economic), the regional strategy to ensure the supply and management of mineral resources aims to:

- include mining activities in the general framework of environmental planning;
- share the goals with stakeholders;
- safeguard non-renewable resources with appropriate measures;
- promote the use of technology in mining;
- achieve the goal of preserving agricultural land;
- promote environmental impact assessments;
- consider guarantees for the restoration and recovery of mining areas;
- increase the recovery of inert waste.

For 2014–2020, the **Apulia Region** has allocated approximately EUR 120 million for the completion and strengthening of the regional civil and industrial wastewater treatment system in order to encourage the reuse of treated wastewater in the region, in particular for the agricultural, residential and industrial sectors. The topic of wastewater treatment has great importance in terms of environmental sustainability, energy and secondary raw materials.

The Apulia Region has always faced a water crisis due to low precipitation and, consequently, the scarcity of watercourses. Over the years, new risk factors have been introduced, primarily climate change. To address this emergency, the regional administration, in collaboration with local authorities, has planned and implemented projects for adequate water use, the restoration and efficient working of reservoirs, completion of dam building and the recovery of wastewater.

In the **Puglia Region**, to improve the opportunities provided by the European Regional Development Fund (ERDF) and the European Social Fund (ESF) to increase the quality and efficiency of infrastructure, the regional authority allocated EUR 300 million for the period 2007–2013 and EUR 110 million for the period 2014–2020 to improve wastewater treatment plants, and EUR 30 million for the reuse of treated wastewater in agriculture.

The National Packaging Consortium (CONAI) is a not-for-profit system for developing responses from private companies to a problem of collective interest – the environment – in accordance with guidelines and objectives set by the political system. More than 900 000 companies which produce or use packaging have joined the CONAI. Founded on the basis of the 1977 Ronchi Decree, the Consortium has been involved in the transition from a management system based on landfill to an integrated system based on the prevention, recovery and recycling of six packaging materials: aluminium, glass, paper, plastic, steel and wood. The Consortium collaborates with municipalities according to specific agreements governed by the Associazione Nazionale dei Comuni Italiani (ANCI)–CONAI National Framework Agreement and serves as a guarantee to citizens that any materials from separate waste collections are fully used through proper recovery and recycling processes. Any companies that join the Consortium pay a compulsory contribution,

[19] http://www.anci.lombardia.it/documenti/6919-Strategia_MateriePrime.pdf (Italian)

which allows CONAI to support separate waste collection and packaging recycling. CONAI directs the activities and guarantees the recovery results of six consortia: aluminium (Cial), glass (Coreve), paper/cardboard (Comieco), plastic (Corepla), steel (Ricrea) and wood (Rilegno), and ensures the necessary link between these consortia and public administration.

Cial [20] is a not-for-profit consortium that represents the commitment of aluminium producers and aluminium packaging producers and users to finding ways of reducing and recovering packaging, while striking a balance between market demand and the need to protect the environment. Over the past year, through its agreements with more than 5,400 Italian municipalities and the involvement of 47 million citizens, the CIAL has recovered 70 per cent of the aluminium packaging placed on the Italian market.

Coreve[21] is the national consortium responsible for the recycling and recovery of glass packaging. This consortium is formed by all the companies that manufacture glass packaging, as well as importers, bottlers and wholesalers. It streamlines, organises, manages and promotes the collection of glass packaging from the separate collections run by public services, ensuring that it is recycled.

Comieco[22] is a national consortium for the recovery and recycling of paper and cardboard, bringing together companies from the Italian paper and cardboard industry, including producers, processors and recyclers. Between 1998 and 2015, thanks to the development of paper and cardboard recycling, the share of recycling in Italy grew from 37 per cent to almost 80 per cent, with four out of every five cellulose packs now being recycled.
Website:

Corepla[23] is the national consortium for the collection, recycling and recovery of plastic packaging waste, involving the entire industrial sector: producers and converters of plastics for the manufacture of packaging, as well as any companies, on a completely voluntary basis, which use plastic packaging and recover/recycle plastic packaging. Thanks to Corepla, more than 90 per cent of Italian municipalities now recycle plastic packaging, allowing the recovery of 867,000 tonnes.
Website:

Ricrea[24] is the consortium that looks after the recycling of steel packaging, such as jars, tins, caps, barrels, cans and spray cans from separate waste collections organised by municipalities. In 2015, Ricrea, working with 5,750 municipalities and more than 48 million Italian citizens, recycled 348,000 tonnes of steel packaging, 73.4 per cent of the materials on the market.

Rilegno[25] is the consortium that recovers wooden packaging waste, bringing together all producers in the sector from suppliers of packaging materials to manufacturers of fruit and vegetable packaging or industrial pallets and packaging, to importers of packaging materials and empty wooden packaging as well as wooden packaging recycling companies. Thanks to Rilegno's work, each year more than 1.6 million tonnes of wooden packaging waste are recycled: about 95 per cent of this waste is semi-processed for the furniture industry. Rilegno is also the reference consortium for cork recycling.

Contarina: the Priula and Tv Tre consortia
Contarina is responsible for the management of waste from the municipalities belonging to the Priula and Tv Tre Consortia, within the province of Treviso in the Veneto region. It covers an area of approximately 1,300 square kilometres with about 554,000 inhabitants. Using an integrated system dealing with the

[20] www.cial.it (Italian)
[21] www.coreve.it (Italian)
[22] www.comieco.org (Italian)
[23] www.corepla.it (Italian)
[24] www.consorzioricrea.org (Italian)
[25] http://www.rilegno.org/ (Italian)

production, collection, treatment and recovery of waste, it has had a positive impact on the environment as well as on the lives of citizens.

Contarina's success is based on a pay-as-you-throw curbside collection system, a model that has been thoroughly tried and tested. For years, Contarina and the consortia have been European leaders in recycling and are an example of cutting-edge public entities in terms of services and results, working with the community to achieve a common goal: environmental protection**.**

Sicilia Ecoinnovation symbiosis system
Promoted by ENEA, the goals of the project were to provide a methodology and an instrument for industrial symbiosis at regional scale, to establish a support platform for SMEs to introduce symbiosis opportunities in the region. The whole approach includes network activation; platform architecture, design and implementation; analysis of the productive sector in Sicily; data collection; and companies' involvement. In particular the project focuses on the activities developed for the creation of the companies' network through a preliminary analysis of the predominant productive sectors, followed by the organisation of meetings in Sicily for the companies involved, analysis of potential synergies and resources sharing, and finally platform take-up.

The Sicilia Ecoinnovation project has made it possible to create a database of approximately 2,200 companies operating in Sicily, from the agro-industry, transport and logistics, metal engineering, construction and waste management sectors. Currently, around 90 companies work in synergy with the programme, and about 600 synergies have been activated.

The Sicilia Ecoinnovation project, carried out by ENEA, is considered for inclusion in the SUN Agreement.

Capannori – Zero Waste Strategy[26]
The first Italian municipality to join the Zero Waste Strategy was Capannori, Lucca, Tuscany, on 14 June 2007 on the initiative of the then mayor, Rossano Ercolini, who received the Goldman Prize in 2013. To date, there are 251 Italian municipalities involved in the Zero Waste Strategy.

The results of the Zero Waste Strategy are amazing: on average 80 per cent of refuse is recycled. Nonetheless, a substantial percentage still ends up in landfill. Zero Waste Italy and the Capannori Zero Waste Research Centre are carrying out various projects to improve the situation: the Double Dirty Dozen is one of these, the name of which was inspired by about 25 single-use or non-recyclable products, including toothbrushes, toothpaste tubes, plastic cutlery, ballpoint pens and latex gloves. The project seeks to involve producers of the Double Dirty Dozen to redesign their products to make them recyclable.

The goal of Zero Waste is just that, a goal. What really matters is the approach: an understanding that waste is not waste, but paper, plastic, glass, metal or food residues that can be processed without expensive machines or procedures. The important thing is good initial separation, collected door to door, and with organic waste divided from the rest as it can be toxic to water and soils, but can become compost for agriculture.
Website:

Screen – Synergic circular economy across European regions
Presented on the Horizon 2020 programme, the Screen project – led by the Lazio Region with Lombardy collaborating with its Intelligent Factory Association (AFIL) – aims, in the context of the Intelligent Specialisation Strategy, to define a systematic approach that can be replicated towards a transition to the circular economy.

[26] http://www.rifiutizerocapannori.it/rifiutizero/ (Italian)

Initiated in 11 European regions, the project is expanding to another six regions (accession procedures are in progress). It operates through the identification and implementation of operational synergies between different investment channels, contributing to new eco-business models leading to innovation between different value chains.

The objective of the Screen project is to create a systemic and replicable approach in other European regions that can stimulate the development of the circular economy across Europe. This will be achieved by analysing the socio-economic and industrial characteristics of the regions involved, identifying areas of specialisation and existing economic trends.

Other resources

Examples of policies which go beyond "material resources"

In 2017, Italy published its first **Report on Natural Capital**[27].

- Its aim is primarily to have a description and assessment of natural capital stock and assets as well as ecosystem services provided. This takes varying perspectives: biophysical and economic; quantitative and qualitative. A few case studies are also included.
- Furthermore, the report makes a number of recommendations to protect and strengthen the current stock of natural capital.
- The Report recommends some lines of research to explore and better understand the underlying dynamics of the exploitation of natural assets.

The main lesson of the Report is that a coordinated effort, within the government and among stakeholders, is needed to define policies addressing the topic and push behavioural change in order to reduce pressure on environmental resources.

Guidelines for policymakers should be provided to define methodologies and general rules for examining the costs and benefits of new infrastructural projects by considering the economic, social and environmental impacts and harmonising respective needs.

The second edition of the Report on the State of Natural Capital, Italy (2018)[28] has made important advances in terms of analysis and improvement in the biophysical and monetary evaluation of ecosystems produced by the national Natural Capital. thanks to an ever-increasing collaboration between experts, national and international research centres, and the public administration.

Pressures on the assets of Natural Capital have been examined in depth. In particular, they have been assessed nationally and also according to an eco-region classification, highlighting the elements that put at risk the conservation status of natural capital, such as soil consumption and fragmentation of natural ecosystems. Attention was also dedicated to the impact of climate change on the sustainability of ecosystems through the focus on highly critical environmental issues for Italy, such as fires and drought.

The way forward

Reflections on future directions of policies on resource efficiency and circular economy

Italy sees the following main challenges and ways to tackle them, when it comes to the implementation of resource efficiency, circular economy and raw materials policies.

[27] http://www.minambiente.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/sintesi_raccomandazioni_primo_rapporto_capitale_naturale_english_version.pdf (English)

[28] https://www.minambiente.it/comunicati/il-secondo-rapporto-sullo-stato-del-capitale-naturale-italia (Italian)

Allowing a level playing field in all sectors, both domestically and internationally, and considering environmental externalities, the internalisation of costs produced by damage to the environment, within the overall production cost function of firms implies reducing or phasing out distorting incentives that induce a higher than socially desirable level of natural resource exploitation, landfill disposal or air pollution. To this end, Law 221/2015, art. 68 asked the MATTM to prepare a catalogue of environmentally friendly subsidies and environmentally harmful subsidies to inform policymaking. The first report was delivered in December 2016. Potentially, the amount of saved public expenditure may be used to foster research on or implementation of cleaner alternatives.

Promoting environmental fiscal reform means reducing taxation on abundant primary inputs, such as labour, and increasing taxation on scarce primary inputs and outputs, for example, natural resources or pollution. Overall, this should be done without affecting the public budget. The final aim is to move technological innovation towards cleaner and more labour-intensive production processes.

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